

#### IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

CHING-YU LIN, et al.

Filed: June 20, 2001

Serial No.: 09/885,799

For: METHOD AND DETECTOR FOR IDENTIFYING SUBTYPES OF HUMAN

PAPILLOMA VIRUSES

Examiner: Myers, Carla J.

Group Art Unit: 1634

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**DECLARATION OF DR. TANG-YUAN CHU UNDER RULE 1.132** 

I, Tang-Yuan Chu, hereby declare that:

- 1. All statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, of both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of this application or any patent issuing thereon.
- 2. I am Dean, Graduate Institute of Medical Sciences, National Defense Medical Center, R.O.C. A full and accurate account of my qualifications including education, publications, titles, and awards, for example, is presented in my *curriculum vitae* (C.V.) as an appendix attached hereto.
- 3. I have intensively studied HPV Papilloma virus subtypes and their association with cervical cancer. I have authored, for example, professional peer-reviewed publications including but not limited to the following, for example:

- 1. Lai HC, Sun JA, Yu MS, Chen HC, Liu HS, Chu TY\* (1999) Favorable clinical outcomes of cervical cancers infected with human papillomavirus type 58 and its related types. Int J Cancer, 84: 553-557. (SCI)
- 2. Sun CA, Yang CJ, Chu TY, Hsieh CY, You SL, Yu MH (2000). Misclassification of human papillomavirus infection in epidemiological studies: Nature and consequences. J Med Sci; 20:333-341.
- 3. Sun CA, Chu TY, Yang CJ, Wu DM, Hsieh CY, You SL, Yu MH. (2000) Understanding the epidemiology of genital human papillomavirus infection in women: Importance of data on type-specific infections. J Med Sci; 20:470-480.
- 4. Sun CA, Lai HC, Chang CC, Neih S, Yu CP and Chu TY\* (2001) The significance of HPV viral load in prediction of histological severity and size of squamous intraepithelial lesions of uterine cervix. Gynecol Oncolog, 83: 95-99. (SCI)
- 5. Sun CA, Liu JF, Wu DM, Neih S, Yu CP, Chu TY\*(2002). Viral load of high-risk human papillomavirus in cervical squamous intraepithelial lesions: A hospital-based case-control study in Taiwan. Int J Gynaecol Obstet. 76(1):41-47 (SCI)
- 6. Chu TY\*, Hwang KS, Yu MH, Chen HJ, Lee HS, Lai HC and Liu JY (2002) A research-based gynecologic tumor tissue bank for molecular oncology: characteristics of of nucleic acids extracted from normal and tumor tissues from different sites. Int J of Gyncol Cancer, 12: 171-176 (SCI)
- 7. Lai HC, Stywu HK, Sun CA, Yu MH, Yu CP, Liu HS, Chang CC, Chu TY\* (2002) Single nucleotide polymorphism at *FAS* promoter is associated with cervical carcinogenesis, Int J Cancer, 2003 Jan 10;103(2):221-5.
- 8. Lai HC, Peng MY, Huang RL, Lin JY, Chu TY (2002) HPV detection and genotyping: comparison of current and emerging methodologies: Hybrid Capture, PCR-reverse line blot and PCR-HPV gene chip. 2002 Annual Meeting of the Taiwan Association of Obstetrics and Gynecology, Taipei.
- 9. Chu TY (2002) Human papillomavirus diseases: the spectrum of clinical diagnosis. Invited speech at "Consensus Conference in Cervical Pathology" of Taiwan Association of Pathology; Kao-Shung, Taiwan.
- 10. Chu TY (2002) Combination of HPV testing and Pap smear in screening of cervical cancer: Cost- effectiveness assessment in Taiwan. 2002; Joint Conference of Cancer, Taiwan.
- 11. Chu TY (2002) Clinical cohort and tissue banking: the key of translating genomic research. Invited Speech at Ma-Kai Memorial Hospital and Veteran General Hospital, Taipei.
- 12. Chu TY (2002) Human papillomavirus and Cervical Cancer: Toward the

- novel diagnostic and preventive measures in Taiwan. Invited speech at National Chen-Gong University Medical College
- 13. Chu TY, Hsieh HC, Sun CA, Lai HC, Chao CF (2002) Genetic polymorphisms of metabolizing genes and risk of cervical cancer development. Ninth Bianual Meeting of International Gynecologic Cancer Society. Seoul, Korea.
- 14. ChuTY, Sun CA, Yu CP, Yu MH (2002) Toward a comprehensive genetic diagnosis of cervical cancer. In 2<sup>nd</sup> Conference on Cancer Genomics of NHRI, Tao-Yuan, Taiwan.
- 15. ChuTY (2002) HNPCC: Genetic characterization and diagnosis. In Sixth Annual Meeting of Taiwan Cooperative Oncology Group, NHRI, Taipei.
- 4. By training and experience, accordingly, I am familiar with the nucleic acid molecular characteristics of HPV Papilloma virus subtypes.
- 5. I am familiar with the statements in the present file of United States Application Serial No. 09/885,799, the specification, the claims, as well as the Amendment being filed with this Declaration.
  - 6. I am not an inventor on the above-identified pending application.
- 7. I am familiar with the sequences of human papilloma virus subtypes that were described in the original application (U.S. Serial No. 09/855,799, filed June 20, 2001) by HPV subtype, NCBI Accession number, and loci (reproduced in Table I as follows):

	Table I	
HPV subtype	Accession number/bp	loci /bp
HPV 11	NC 001525/7931	6727 - 7135/409
HPV 16	NC 001526/7904	6602 - 7013/412
HPV 18	NC 001357/7857	6578 - 6992/415
HPV 26	NC 001583/7855	6553 - 6967/415
HPV 31	NC 001527/7912	6520 - 6931/412

HPV	32	NC	001586/7961	6837	7 –	7245/409
HPV	33	NC	001528/7909	6559	<b>)</b>	6967/409
HPV	35	NC	001529/7851	6542	2 –	6953/412
HPV	37	NC	001687/7421	671	L –	7125/415
HPV	39	иС	001535/7833	660	5 –	7019/415
HPV	42	NC	001534/7917	680	)2-	7210/409
HPV	43	Ţ	J12504/455	2	1-4	35/415
HPV	44	NC	001689/7833	664	7 –	7061/415
HPV	45	NC	001590/7858	6582	2 –	6996/415
HPV	51	NC	001533/7808	648	5 –	6897/412
HPV	52	NC	001592/7942	662	3 –	7031/409
HPV	53	NC	001593/7856	661	4 –	7022/409
HPV	54	NC	001676/7759	656	1 -	6972/412
HPV	56	NC	001594/7844	655	9 -	6967/409
HPV	58	NC	001443/7824	660	8 -	7016/409
HPV	59	NC	001635/7896	657	1 -	6985/415
HPV	61	NC	001694/7989	673	2 –	7146/415
HPV	62	τ	J12499/449	21	. –	429/409
HPV	66	NC	001695/7824	660	9 –	7017/409
HPV	67	D	21208/7801	658	4 -	6992/409
HPV HPV			73258/6042 002171/7700			2996/415 6923/415
HPV	7 6	NC	000904/8012	674	3 –	7151/409
HPV	70	NC	001711/7905	654	9 -	6963/415

HPV 72	X94164/7988	6758 - 7172/415
HPV 74	U40822/3891	1613 - 2027/415
HPV 82 HPV CP8061	AB027021/7871 U12479/452	6536 - 6950/415 21 - 432/412
HPV CP8304	U12480/452	21 - 432/412
HPV L1AE5	AF039910/364	11 - 360/350
HPV MM4	U12488/455	21 - 435/415
HPV MM7	U12489/452	21 - 432/412
HPV MM8	U12490/452	21 - 432/412

- 8. I herein confirm and attest to the fact that each of these sequences was published and publicly available on June 20, 2001, for example, from the National Center for Biotechnology Information (NCBI) (e.g., www.ncbi.nih.gov).
- 9. I further confirm and attest to the fact that each of the sequences described in Table I, *supra*, particularly identified by NCBI Accession number and loci, <u>as published June 20, 2001</u>, are in fact identical respectively to the sequences, i.e., SEQ ID NO:651- SEQ ID NO:688, <u>reproduced herein as follows</u>, now recited in the Sequence Listing of the subject pending United States Patent Application Serial No. 09/855,799, and referred to in now pending claim 13.

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6727 - 7135/409 bp
TATTTGCTGG GGAAACCACT TGTTTGTTAC TGTGGTAGAT ACCACACGCA GTACAAATAT
                                                                       60
GACACTATGT GCATCTGTGT CTAAATCTGC TACATACACT AATTCAGATT ATAAGGAATA
                                                                      120
CATGCGCCAT GTGGAGGAGT TTGATTTACA GTTTATTTTT CAATTGTGTA GCATTACATT
                                                                      180
ATCTGCAGAA GTCATGGCCT ATATACACAC AATGAATCCT TCTGTTTTGG AGGACTGGAA
                                                                      240
CTTTGGTTTA TCGCCTCCAC CAAATGGTAC ACTGGAGGAT ACTTATAGAT ATGTACAGTC
                                                                      300
ACAGGCCATT ACCTGTCAGA AACCCACACC TGAAAAAGAA AAACAGGATC CCTATAAGGA
                                                                      360
                                                                      409
TATGAGTTTT TGGGAGGTTA ACTTAAAAGA AAAGTTTTCA AGTGAATTA
(SEQ ID NO: 651);
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HPV 16 6602 - 7013/412 bp	
CATTTGTTGG GGTAACCAAC TATTTGTTAC TGTTGTTGAT ACTACACGCA GTACAAATAT	60
GTCATTATGT GCTGCCATAT CTACTTCAGA AACTACATAT AAAAATACTA ACTTTAAGGA	120
GTACCTACGA CATGGGGAGG AATATGATTT ACAGTTTATT TTTCAACTGT GCAAAATAAC	180
CTTAACTGCA GACGTTATGA CATACATACA TTCTATGAAT TCCACTATTT TGGAGGACTG	240
GAATTTTGGT CTACAACCTC CCCCAGGAGG CACACTAGAA GATACTTATA GGTTTGTAAC	300
CCAGGCAATT GCTTGTCAAA AACATACACC TCCAGCACCT AAAGAAGATG ATCCCCTTAA	360
AAAATACACT TTTTGGGAAG TAAATTTAAA GGAAAAGTTT TCTGCAGACC TA	412
(SEO ID NO: 652);	412
(SEQ ID NO: 632);	
HPV 18 6578 - 6992/415 bp	
TGTTTGCTGG CATAATCAAT TATTTGTTAC TGTGGTAGAT ACCACTCCCA GTACCAATTT	60
AACAATATGT GCTTCTACAC AGTCTCCTGT ACCTGGGCAA TATGATGCTA CCAAATTTAA	120
GCAGTATAGC AGACATGTTG AGGAATATGA TTTGCAGTTT ATTTTTCAGT TGTGTACTAT	180
TACTTTAACT GCAGATGTTA TGTCCTATAT TCATAGTATG AATAGCAGTA TTTTAGAGGA	240
TTGGAACTTT GGTGTTCCCC CCCCCCAAC TACTAGTTTG GTGGATACAT ATCGTTTTGT	300
ACAATCTGTT GCTATTACCT GTCAAAAGGA TGCTGCACCG GCTGAAAATA AGGATCCCTA	360
TGATAAGTTA AAGTTTTGGA ATGTGGATTT AAAGGAAAAG TTTTCTTTAG ACTTA	415
(SEQ ID NO: 653);	
HPV 26 6553 - 6967/415 bp	
TATCTGTTGG GGCAATCAAT TGTTTGTTAC CTGTGTTGAT ACCACCCGCA GTACTAACCT	60
TACCATTAGT ACATTATCTG CAGCATCTGC ATCCACTCCA TTTAAACCAT CTGATTATAA	120
ACAATTTATA AGACATGGCG AAGAATATGA ATTACAATTT ATATTTCAGT TGTGTAAAAT	180
AACACTTACA ACAGATGTTA TGGCTTACAT ACATTTAATG AATGCCTCCA TATTGGAGGA	240
TTGGAATTTT GGACTAACCT TACCTCCCAC TGCTAGTTTG GAAGATGCCT ATAGGTTTAT	300
TAAAAACTCT GCTACTACCT GTCAGCGTAA CGCCCCTCCT GTGCCAAAGG AAGATCCTTT	360
TCAAAAATTT AAATTTTGGG ATGTAGATTT AAAAGAAAAA TTTTCTATTG ATTTG	415
(SEQ ID NO: 654);	
HPV 31 6520 - 6931/412 bp	
TATTTGTTGG GGCAATCAGT TATTTGTTAC TGTGGTAGAT ACCACACGTA GTACCAATAT	60
GTCTGTTTGT GCTGCAATTG CAAACAGTGA TACTACATTT AAAAGTAGTA ATTTTAAAGA	120
GTATTTAAGA CATGGTGAGG AATTTGATTT ACAATTTATA TTTCAGTTAT GCAAAATAAC	180
ATTATCTGCA GACATAATGA CATATATTCA CAGTATGAAT CCTGCTATTT TGGAAGATTG	240
GAATTTTGGA TTGACCACAC CTCCCTCAGG TTCTTTGGAG GATACCTATA GGTTTGTCAC	300
CTCACAGGCC ATTACATGTC AAAAAACTGC CCCCCAAAAG CCCAAGGAAG ATCCATTTAA	360
AGATTATGTA TTTTGGGAGG TTAATTTAAA AGAAAAGTTT TCTGCAGATT TA	412
(SEO ID NO: 655);	412
(SEQ 1D NO. 655),	
HPV 32 6837 - 7245/409 bp	
TATATGTTGG GGTAATCAAG TGTTTCTAAC TGTTGTGGAT ACTACCCGTA GTACTAACAT	60
GACTGTGTGT GCTACTGTAA CAACTGAAGA CACATACAAG TCTACTAACT TTAAGGAATA	120
TCTACGCCAT GCAGAGGAAT ATGATATACA GTTTATATTT CAATTGTGCA AAATTACATT	180
ATCTGTAGAG GTTATGTCAT ATATCCACAC CATGAATCCT GACATACTAG ACGATTGGAA	
TGTTGGTGTA GCTCCACCGC CCTCTGGTAC TTTAGAAGAT AGTTATAGAT TTGTGCAGTC	300
TCAGGCCATA CGATGTCAAG CTAAGGTAAC AGCACCTGAA AAAAAGGATC CTTTTTCTGA	360
CTATTCATTT TGGGAAGTAA ATTTATCTGA AAAGTTTTCT AGTGATTTA	409
(SEQ ID NO: 656);	
WDW 00	
HPV 33 6559 - 6967/409 bp	
(SEQ ID NO: 656); HPV 33 6559 - 6967/409 bp	

TATTTGTTGG GGCAATCAGG TATT GACTTTATGC ACACAAGTAA CTAG TATAAGACAT GTTGAAGAAT ATGA AACTGCAGAA GTTATGACAT ATAT ATTTGGTTTA ACACCTCCTC CATC TCAGGCTATT ACGTGTCAAA AAAC ATATACATTT TGGGAAGTGG ATTT (SEQ ID NO: 657);	TGACAG TACATATAAA TCTACA GTTTGTTTT TCATGC TATGAATCCA TGCTAG TTTACAGGAT AGTACC TCCAAAGGAA	AATGAAAATT CAACTATGCA GATATTTTAG ACCTATAGGT AAGGAAGACC	TTAAAGAATA AAGTTACCTT AAGATTGGCA TTGTTACCTC	60 120 180 240 300 360 409
HPV 35 6542 - 6953/41 TATTTGTTGG AGTAACCAAT TGTT GTCTGTGTGT TCTGCTGTGT CTTC ATATTTAAGG CATGGTGAAG AATA ACTAACAGCA GATGTTATGA CATA GAATTTTGGC CTTACACCAC CGCC ATCACAGGCT GTAACTTGTC AAAA AAATTATACT TTTTGGGAGG TTGA (SEQ ID NO: 658);	TGTTAC TGTAGTTGAT TAGTGA CAGTACATAT TGATTT ACAGTTTATT TATTCA TAGTATGAAC TTCTGG TACCTTAGAG ACCCAG TGCACCAAAA	AAAAATGACA TTTCAGTTAT CCGTCCATTT GACACATATC CCTAAAGATG	ATTTTAAGGA GTAAAATAAC TAGAGGATTG GCTATGTAAC ATCCATTAAA	60 120 180 240 300 360 412
HPV 37 6711 - 7125/41 CATTTTATGG GGTAATCAAA TGTT TTCTATTAGT GTGTCTACTG ACAA AGAATACCTA AGACATGTTG AAGA TCCTTTAAAG GCTGAGGTTT TAAC GTGGCAATTA GGATTTGTAC CTAC TAATTCAAAG GCTACCAAGT GTCC TGCAAAATAT ACATTTTGGA ATGT (SEQ ID NO: 659);	TATCAC AGTTGCTGAT TGGCGA AGTTACAGAA ATACCA GCTTTCAATT TCAGAT AAATGCAATG TCCAGA TAATTCAGTA TGATGC AGTTGTTGAA	TATAATTCTC ATTTTACAAC AATTCTGGTA CATGACCTTT AAAGAAAAGG	AAACACTCAG TTTGTAAAGT TATTGGAAGA ATAGGTACAT AAGATCCCTT	60 120 180 240 300 360 415
HPV 39 6605 - 7019/41 TATATGTTGG CATAATCAAT TATT TACATTATCT ACCTCTATAG AGTO GGAATATACC AGGCACGTGG AGGA CACATTAACA ACTGATGTTA TGTO TTGGAATTTT GCTGTAGCTC CTCC ACAGTCTGCA GCCATTACAT GTCA TGACGGTCTA AAGTTTTGGA ATGT (SEQ ID NO: 660);	TCTTAC TGTTGTGGAC TTCCAT ACCTTCTACA GTATGA TTTACAATTT TTATAT TCACACTATG ACCATC TGCCAGTTTG AAAGGA TGCTCCAGCA	TATGATCCTT ATATTTCAAC AATTCCTCTA GTAGACACTT CCTGAAAAGA	CTAAGTTTAA TGTGTACTGT TATTGGACAA ACAGATACCT AAGATCCATA	60 120 180 240 300 360 415
HPV 42 6802-7210/409 TATATGTTGG GGAAATCAGC TATT GACTTTGTGT GCCACTGCAA CATC TTTAAGACAT GCTGAAGAAT ATGA AACTGTTGAA GTTATGTCAT ATAT TGTTGGTGTT GCACCACCAC CTTC AGAAGCTATT CGCTGTCAGG CTAA CTTTTGGTTT TGGGAGGTAA ATTT (SEQ ID NO: 661);	TTTAAC TGTGGTTGAT TGGTGA TACATATACA TGTGCA ATTTATATTT ACACAA TATGAATCCT AGGAAC TTTAGAAGAT GGTAAC AACGCCAGAA	GCTGCTAATT CAATTGTGTA AACATATTAG AGTTATAGGT AAAAAGGATC	TTAAGGAATA AAATAACATT AGGAGTGGAA ATGTACAATC	60 120 180 240 300 360 409
HPV 43 21-435/415 bp CATTTGTTTT GGGAATCAGT TGTT GACGTTATGT GCCTCTACTG ACCC GGAATACTTG CGGCATGTGG AAGA	TACTGT GCCCAGTACA	TATGACAATG	CAAAGTTTAA	60 120 180

HPV 44	CTGGAATTTT GTCTAACAAG	GGTGTGTCCC GCCATTGCAT ACATTTTGGG	CACCTGCCTC GTCAAAAAAA	TGCTTCTTTG TGCTCCCCCA	GATCCCACAT GAAGATACTT AAGGAACGGG TTTTCTGCAC	ATCGCTTTTT AGGATCCCTA	240 300 360 415
### ACTITION OF GARANCAGE TATTTOTIAN TOTAL TOTAL ACTION OF ARCANACAT GARACATT AGARACATT GARACATT GARACATT AGARACATT GARACATT GARACATT AGARACATT AGARACATT GARACATT GARACATT ATTATTATATATA 120 GARACATT GARACATT GARACATT AGARACATT AGARACATT ATTATTATATATAT 120 GARACATT GARACATT GARACATT GARACATT GARACATT ATTATTATATATAT 120 GARACATT AGARACATT AGARACATTATAT AGARACATT AGARACATT AGARACATT AGARACATT AGARACATT AGARACATTATAT GARACATTATAT GARACATTATA AGARTTAGA TATCACATTATA AGARTTAGA TATCACATTATA AGARTTACAT GARACATTA AGARTTACAT GARACATTA AGARTTACAT GARACATTA AGARTTACA AGARTTACA CACACACATA TACACATTATA AGARTTACA AGARTTACA CACACACATA TACACATTATA AGARTTACA AGARTTACA CACACACATA TACACATTA ACACATTACA ACACATTACACAC ACACACATA TACACATTA ACACATTACA AGARTTACA CACACACACATA TACACACATA ACACATTACA AGARTTACA AGARTTACA AGARTTACA CACACACACATA TACACACATA ACACATTACA ACACATACACAT ACACACAC	HPV 44	6647 - 706	61/415 bp				
GRARTARGT GCTGCCACTA CACAGTCCC TCCGTCTACA TATACTAGT ACCATTATA GCAATACATG CGACATGTT AGGACTTTGA CTTACAATTT ATGTTACAT TATGTAGTAT TACCTTAACG GCGGAGGTAA TGGCCTATCT TCATACTATG ATGTTCAAT TATGTAGTAT TACCTTAACG GCGGAGGTAA TGGCCTATCT TCATACTATG ATGTTCAAT TATGTAGACA GTGGAACTTT GGGTTGTCGC CGCCCCAAA TGGTACCTTA GAGGACAAAT ACAGATATGT GCAGATCCAG GCCATTACAA GACACCCCT AGAAAGAAGA AGAGACCCTA 360 GCGAGTACCAG GCCATTACAA GACCCCCCAAA AAGGCAAAGA ACAGACCCTA 361 GSEQ ID NO: 663);  HPV 45 6582 - 6996/415 bp TATTTGTGTGG CATAATCAGT TGTTTGTTAC TGTAGTGAC ACTACCCGCA GTACTAATTT GCACATTATGT GCCTCTACAC AAAATCCTGT GCCAGATACA TATTGACCCTA CTAAGTTTAA 120 GCAGTATAGT AGACATGTGG AGGAATATCA ATTTTCAGGTTA TATTTTCAGT TGTGCACTAT 180 GCAGTATAGT GCAGGGTTA TGTCATATAT CCATAGGTTA ATTTTTCAGT TGTGCACTAT 180 GCAGTATAGT GCGGGGGTTA TGTCATATAT CCATAGGTTA ATTTTTCAGT TGTGCACTAT 180 GCAGTACAGT GCTGTTACCT GTCAAAAGGA TACTACACT CCAGAAAAGC AGGATCCATA 360 GCAGTACAGT GCTGTTACCT GTCAAAAGGA TACTACACCT CCAGAAAAGC AGGATCCATA 360 GCAGTACAGT GCTGTTACCT GTCAAAAGGA TACTACACCT CCAGAAAAGC AGGATCCATA 360 GCAGTATAGT AAGATTTTGGA CTGTTACCT AAAGGAAAAA TTTTCCTCCG ATTTG  TTTTCTCTCG ATTTG GCACTACAGC TTTTTATTAC CTGTGTTGAT ACTACACAGA GTACAAATTT 40 GCAGTTTAGCACAGC TTTTTATTAC CCCACACTTT ACTACACAGA GTACAAATTT 60 AACTACTTAGC ACTGCGACTC CTGCGGTTTC CCCAACACTTT ACTACAGAA GTACAAATTT 60 AACTACTTAGC ACTGCGACTC CTGCGGTTC CCCAACACTTT TCCAAGTA ACTTTAAGCA 120 AAATTTTAGC ACTGCGACTC CTGCGGTTC CCCAACACTTT TCCAAGTA ACTTTAAGCA 120 AAATTTTAGC ACTGCGACT CTGCGGTTC CCCACACCTT TCTCAACAGT 240 GAATTTTTGA TTAACAATAC CTCCGTCTG TAGTTTGGA GACACACTTC TTGAACAGT 240 GAATTTTTGA TTAACAATAC CTCCGTCTG TAGTTTGGA GACACACTTC TTGAACAGT 240 GAATTTTTGA TTAACATAC CTCCGTCTG TAGTTTGGA ACCACTCGTA GCACTTC TTGACAGT 240 GAATTTTTGG GCAACACAC CTCCTCTCG TAGTTTGGA ACCACTCGTA GCACTTCTTGGC 360 AAAAGCACTAA TTTTTGTCAC AGTTTTAAAAAAAAAAA			_	TGTTGTAGAT	ACTACCCGTA	GTACAAACAT	60
GCARTACATG   CACATGTTG   AGGAGTTTGA   CTTACAATTT   ATGTTCAAT TATGTAGTAT   TATCTTAGAC   240							
TACCTTAACG GCGAGGTAA   TGGCCTATCT   TCATACTATG   AATGCTGGTA   TTTTAGAACA   GTGGACTTT   GGGTTGTCGC   GCCCCCCAAA   TGGTACCTTA   GAGGACCAAT   ACAGATATGT   360   36							180
GCASTCCCAG GCATTACAT GTCANAAGCC   ACCCCTGAN   AAGGCAAAGC   AGGACCCTA   AGGTTG   ACACTTATGT   AGCATAGTG   AGGTTGTTACA   AGAATCCTGT   GCCAAGTACA   TATGACCCTA   CTAAGTTTAA   AGGTTTAACT   GCCACACCTA   CTAAGTTTA   CACAAGTTTT   ATTTTCAGT   TATGAGAAA   AGGTTAAATTT   AGGTTTAACT   GCACACCTAC   CACAACCTAC   TACAAGTTTG   ATTTTTCAGT   ATTTTTGAGT   AGGACTCATA   AGGTTTAACT   AGGTTAAATTA   AGGTTTAACT   AGGTTAAATTA   AGGTTAAATTA   AGGTTTAATTAC   AGGTTAAATTAC   AGGTTAAATTAC   ACTGGGGTTC   CCCAACACTT   ACTCCAAGAA   ACTTTAACT   ACTACAAGAA   ACTTTAACTAC   AGGTTAATTAC   ACAAATTAC   ACAAATTAC   ACAAATTAC   ACAAATTAAC   ACAAATTAC   AAAAGGACAC   CCCTCCACAG   GCACAACACA   ACTTTATTAC   AAAAGGACAC   AAAAGGACAC   ACTAACAAT   ACACACCAC   ACTAAAATTAC   ACAAATTAC   ACAAATCAGAA   AAAAAACAACAC   AAAAAACACAC   AAAAAACACAC   AAAAA							240
TGCAAAATTA AGTTTTGGG AGGTGGATCT TAGAGAAAAG TTTTCTAGTG AGTTG	GTGGAACTTT	GGGTTGTCGC	CGCCCCAAA	TGGTACCTTA	GAGGACAAAT	ACAGATATGT	300
SEQ ID NO: 663);	GCAGTCCCAG	GCCATTACAT	GTCAAAAGCC	ACCCCTGAA	AAGGCAAAGC	AGGACCCCTA	360
HPV 45 6582 - 6996/415 bp TATTTGTTGG CATAATCAGT TGTTTGTTAC TGTAGTGGAC ACTACCGCA GTACTAATTT 60 AACATTATGT GCCTCTACAC AAAATCCTGT GCCAAGTACA TATGACCCTA CTAAGTTTAA 120 GCAGTATAGT AGACATGTGG AGGATATAGA TTTACAGTTT ATTTCAGT TGTGCACTAT 180 TACTTTAACT GCAGGGTTA TGTGATATAT CCATAGTAGT AATGGTGTA TGTGCACTAT 180 TACTTTAACT GCAGGGTTA TGTGATATAT CCATAGTAGT AATGGTGTA TGTGCACTAT 180 TACTTTAACT GCAGGGTTA TGTGATATAT CCATAGTAGT AATGGTGTA ATCGTTTTGT 300 GCAATCAGTT GCTGTTACCT CACCACCTAC TACAAGTTT GTGGAAAATA ATCGTTTTGT 300 GCAATCAGTT GCTGTTACCT GTCAAAAGGA TACTACACCT CCAGAAAAGC AGGATCCATA 360 TGATAAAATTA AAGTTTTGGA CTGTTGACCT AAAGGAAAAA TTTCCTCCG ATTG 415 (SEQ ID NO: 664);  HPV 51 6486 - 6897/412 bp CATTTGCTGG AACAATCAGC TTTTTATTAC CTGTGTTGAT ACTACCAGAA GTACAAATTT ACTACATAGC ATCACACT CCCACACTTC CCCACACTTT ACTCCAAGTA ACTTTAAGCA 120 AATATAATTAGC CATGGGGAA AGGATAGAAAT GCAAATTTATT TACAATATAT GTAAAAATTAC 180 TATAAATTAGC CATGGGGAA AGGATAGAAAT GCAAATTTATT TACAATATAT GTAAAAATTAC 180 TATTAACTACA GAGGTAATGG CTTATTTACA CACCAATTAT TTTCAATTAT GTAAAAATTAC 180 CAAAATTTAGA TACACTTAC CTCCGTCTGC TAGTTTGGAG GATGCAATTA GGTAAAATTAC 180 CAAAATATAAA TTTTGGGATG TTGATTTAAA GGAACGATT TCTTTAGATT TA 412 (SEQ ID NO: 665);  HPV 52 6623 - 7031/409 bp CATATGTTGG GCCAACCAC TGTGTTGTAAAAAA AAAGGAAAA GCACACATAAA AATGCAACT GCCAACCACA GCCCCCACACA GCACACACAAAAAAAA	TGCAAAATTA	AGTTTTTGGG	AGGTGGATCT	TAGAGAAAAG	${\tt TTTTCTAGTG}$	AGTTG	415
TATTTGTTG CATAATCAGT TGTTTGTAC TGTAGTGAC ACTACCGCA GTACTAATTT AAACATTATTT GCCTCTACCAC AAAATCCTGT GCCAAGTACA TATGACCTTA TGTAGGTTTAA 120 GCAGTATAGT AGACATGTGG AGGAATATGA TTTACAGTTT ATTTTACAT TGTGCACTATTAGT AGACATGTTAGA TGACATGTAGA AGGAATATGA TTTACAGTTT ATTTACAT TGTGCACTAT TGTCACTATAT TGTCATATAT CCATAGTATG AATAGTAGAT TATTAGAAAA 240 TTGGAATTTT GGTGTCCCTC CACCACCTAC TACAAGTTTG GTGGATACAT TATTAGAAAA 240 TGGATAAATTA AAGTTTTGGA CTGTAGACT ACACCTACCACACACTAC TACAAGTTTG GTGGATACAT ACGTTTTGT 300 GCAATCAGTT GCTGTTACCT GTCAAAAGGA TACACCT CCAGAAAAGC AGGATCCATA 360 TGATAAATTA AAGTTTTGA CTGTTGACCT AAAGGAAAAA TTTTCCTCCG ATTG 415  HPV 51	(SEQ ID NO	: 663);					
TATTTGTTG CATAATCAGT TGTTTGTTAC TGTAGTGGAC ACTACCGCA GTACTAATTT 120 AACATTATGT GCCTCTACAC AAAATCCTGT GCCAAGTACA TATGACCCTA CTAAGTTTAA 120 GCAGTGTAAGT AGGACATGTGG AGGAATATGA TTTACCAGTTT ATTTTCAGT TGTGCACTAT 160 TACTTTAACT GCAGAGGTTA TGTCATATAT CCATAGTTG ATTTTTCAGT TGTGCACTAT 160 TACTTTAACT GCAGAGGGTTA TGTCATATAT CCATAGTATG AATAGTAGTA TATTAGAAAA 240 TTGGAATTTT GGTGTCCCTC CACCACCTAC TACAAGTTTG GTGGATACAT ATCGTTTTGT 300 GCAATCAGTT GCTGTTACCT GTCAAAAGGA TACACCCT CCAGAAAAGC AGGATCCATA 360 TGATAAATTA AAGTTTTGGA CTGTTGACCT AAAGGAAAAA TTTTCCTCCG ATTTG 415  HPV 51 6486 - 6897/412 bp CATTTGCTGG AACAATCAGC TTTTTATTAC CTGTGTTGAT ACTCCAGAA ACTTTAAGCA 120 AACTATTAGC ACTGCCACTG CTGCGGTTTC CCCAACATT ACTCCAGAA ACTTTAAGCA 120 AATTATATAGC ACTGCCACTG CTGCGGTTTC CCCAACATT ACTCCAGAA ACTTTAAGCA 120 AATTATATAGC ACTGCGAGAA AGTATTACA CTCCAGATT TTTCAATTAT TTTCAATTAT TTTCAATTAT GTAAAATTAC 180 TATAATATACA GAGGTAATGG CTTATTTACA CACAATGGAT CCTACCATTC TTGAACAGTG 240 GAATTTTGGA TTAACACATTAC CTCCGTCTGC TAGTTTGGAG GATGCATATA GGTTTGTTAG 300 AAAATGAAGT ACTTAGCTTAC AAAAGGACAC CCCTCCACAG GCTAAGCCAG ATCCTTTGGC 360 CAAATATAAA TTTTGGGATG TGTTTTCAC AGGTATTA GCTAAGACAT TAACATTAG GGCAATCAGT TGTTTTCAC AGGTATATA GTAAAACAT 120 CCTTCGTCAT GCGAGGAAT TGTTTTCAC AGGTATAAA AATGAAAATT TTAAGGAATT 120 CCTTCGTCAT GCGAGGAAT TTGTTTCAC AGTTTTATT CAATTGTGA ACATTACAT 120 CCTTCGTCAT GCGAAGCAAT TGTTTTCAC AGTTTTATT T CAATTGTGCA AAATTACAT 120 CCTTCGTCAT GCCCACCAC CGCCCC CGTCTGCAT TTGGAGGAC ACATTATAAA AATGAAAAAT TTTAAGGAATA 120 CCTTCGTCAT GCCCACCAC CGCCCC CGTCTGCAT TTGGAGGAC ACATTATAAA AATGAAAATT TTTAAGGAAT 120 CCTTCGTCAT ACCCCACCAC CGCCACCAC ACTCCTCAT TTGAGAGCA ACATTATAAA AATGAAAAAT TTTAAGGAAT 120 CCTTCGTCAT ACCCCACCAC CGTCTGCAT TTGAGAGGAC ACATTATAAA AATGAAAAAT TTTTAAGGAAT 120 CCTTCGTCAT ACCCCACCAC CGTCTGCAT TTGAGAGAC ACATACAAT TTTAAAGGA 120 CCTTCTGTCT ACCCCACCAC CGTCTGCAT TTGAGAGGAC ACATACAAT TTGTGCAC 120 CAACACACA ACAATCAGT TATTTCAAA AAAACACAC ACCAACAC ACCACACAC ACCAC	HDW AE	6582 - <i>6</i> 90	96/415 hn				
AACATTATGT GCCTCTACAC AAAATCCTGT GCCAAGTACA TATGACCCTA CTAAGTTTAA 120 GCAGTATAGT AGACATGTGG AGAAATAGA TTTACAGTTTT ATTTTCAGT TGTGACCTAT 180 TACTTAACT GCAGAGGTTA TATCACATTATA ATTTTTCAGT TGTGACTAT 240 TTGGAATTT GCTGTACACT CACACCTAC TACAAGTTTG GTGGACTAT ATTTGAACATTT ATTTGAACATTT ATTTGAACATTT ATTTGAACATTT ATTTGAACATTT ATTTGAACATTT ATTGGACTAT 300 GCAATCAGT GCTGTTACCT CACCACCTAC TACAAGTTTG GTGGATACAT ATCGTTTTGT 300 GCAATCAGT GCTGTTACCT GTCAAAAGGA TACTACACCT CCAGAAAAGC AGGATCCATA 360 TGATAAAATTA AAGTTTTGGA CTGTTGACCT AAAGGAAAAA TTTCCTCCG ATTTG 415 GEQ ID NO: 664);  HPV 51				тата атаа а	א כידיא כיכיכיכיה	ርሞን ርሞን አጥጥጥ	60
GCAGTATAGT   AGACATGTGG   AGGAATATGA   TTTACAGTTT   ATTTTCAGT   TGTGCACTAT   ATTATACACT   GCAGAGGTTA   TGTCATATAT   CCATAGTATG   AATAGTAGTA   AATAGTAGTA   TATTAGAAAA   240							
TACTTTAACT GCAGAGGTTA TGTCATATAT CCATAGTATG AATAGTAGTA TATTAGAAAA 240 TTGGAATTTT GGTGTCCCTC CACCACCTAC TACAAGTTTG GTGGATACAT ATCGTTTTGT 300 GCAATCAGTT GCTGTTACCT GTCAAAAGGA TACTACACCT CCAGAAAAGC AGGATCCATA 360 TGATAAATTA AAGTTTTGGA CTGTTGACCT AAAGGAAAAA TTTTCCTCCG ATTTG 415 (SEQ ID NO: 664);  HPV 51 6486 - 6897/412 bp CATTTGCTGG AACAATCAGC TTTTTATTAC CTGTGTTGAT ACTACACATA ACTACACATA ACTACAACATA GAACATACACA AGGGTAAAGG CTTATTATACA CACAAATGAAT CCTACCAACAATTAC TTCAAATATAC GAAATTACATAC ACACAACATAC CCCCACACACATATAC ACTACCAACAACATAC ACTACACTGC AAAAGGAACA CCCCTCCACAG GCTAAACACAT ACTCCTTTGGACAGTG 360 AAAATGCAGCT ACTAGCTGTC AAAAGGACAC CCCTCCACAG GCTAAACCATA ACTCCTTTGGC 360 CAAAATTATAAA TTTTGGGATG TTGATTTAAA GGAACAGATATA TACAATATAC TACAATACAA							
TTGGAATTTT GGTGTCCCTC CACCACCTAC TACAAGTTTG GTGGATACAT ATCGTTTTGT  GCAATCAGTT GCTGTTACCT GTCAAAAGGA TACTACACCT CCAGAAAAGC AGGATCCATA 360 TGATAAATTA AAGTTTTGGA CTGTTGACCT AAAGGAAAA TTTTCCTCCG ATTG  (SEQ ID NO: 664);  HPV 51							
GCAATCAGTT GCTGTTACCT GTCAAAAGGA TACTACACCT CCAGAAAAGC AGGATCCATA TGATAAAATTA AAGTTTTGAA CTGTTGACCT AAAGGAAAAA TTTTCCTCCG ATTTG  (SEQ ID NO: 664);  HPV 51				-			
HPV 51 6486 - 6897/412 bp CATTTGCTGG AACAATCAGC TTTTTATTAC CCCACACATT ACTACCAGAA GTACAAATTT 60 AACTATTAGC ACTGCCACTG CTGCGGTTTC CCCAACATTT ACTCCAAGTA ACTTTAAGCA 120 ATATATTAGG CATGGGGAAG AGTATGAATT GCAATTGATT TTTCAATTAT GTAAAATTAC 180 TTTAACTACA GAGGTAATGG CTTATTTACA CACAATGGAT CCTACCATTC TTGAACAGTG 240 GAATTTTGGA TAACATTAC CTCCGTCTGC TAGTTTGGAG GATGCATATA GGTTTGTTAG 300 AAATGCAGCT ACTAGCTGTC AAAAGGACAC CCCTCCACAG GCTAAGCCAG ATCCTTTGGC 360 CAAATATAAA TTTTGGGATG TTGATTTAAA GGAACGATT TCTTTAGATT TA 412 (SEQ ID NO: 665);  HPV 52 6623 - 7031/409 bp CATATGTTGG GGCAATCAGT TGTTTGTCAC AGTTGTGGAT ACCACTCGTA GCACTAACAT 60 GACTTTATGT GCTGAGGAAT TTGATTTACA ATTTATTTTT CAATTGTGA AAAATTACATT 180 AACAGCTGAT GTATGACAT ACATTCATAA GATGGAGAC ACTATTTTAG AGGACTGA AAAATTACAATT 180 AACAGCTGAT GTATGACAT ACATTCATAA GATGGAGAC ACTATTTTAG AGGACTGCA 240 ATTTGGCCTT ACCCCACCAC CGTCTGCACT TTTGGAGGAC ACTATATTAG AGGACTGCA 240 ATTTGGCCTT ACCCCACCAC CGTCTGCACT TTTGGAGGAC ACATACAGAT TTGTCACTTC 300 TACTGCTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA ATGCATACAGT TTTGCACTTC 300 TACTGCTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA 360 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCAGATTTA   60 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCAGATTTA   60 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCAGAGAATT ACCACCACCAC CGTCTGCACT TTTGGAGGAC ACTATACAGAT TTGTCACTTC 300 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCAGATTTA   60 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCAGATTTA   60 CTATATGTTT GCAACCACC AGTCTTATGTC TTTGGAGGAC ACCACACAGA ATACAAACAT 60 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCACACACAC ATACAAACAT 120 CTTCTGCTAG GCAGAGAACACC AGTCTATTGTC TACATATAAT TCAAAAGAAAA TTAAACACAT 120 CTTCTGCTAG GCAGAGGAAT ATGAATTACA ATTTTGTTAT TCAAAGCAAT AAAATATCCCT 180 CTTCTGCTAGA GCAGAGGAAT ATGAATTACA ATTTTGTTAT TCAAAGAACAT AAAATATCCCT 180 CTTCTGCTAGA GCAGAGGAAT ATGAATTACA ATTTTGTATT ACATTACATAC ATTTTGTATAT AAAATATCCCT 180 CTTCTGCTAGA GTTATGCCCT ATTTACATAC TATAGAGAACAT AAAATACAGAT ATGTGAAAAAGA 340							
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CATTTGCTGG AACAATCAGC TTTTTATTAC CTGTGTTGAT ACTACCAGAA GTACAAATTT 60 AACTATTAGC ACTGCCACTG CTGCGGTTTC CCCAACATTT ACTCCAAGTA ACTTTAAGCA 120 ATATATTAGG CATGGGGAAG AGTATGAATT CCACAATGAT TTTCAATTAT GTAAAATTAC 180 TTTAACTACA GAGGTAATGG CTTATTACA CACAATGGAT CCTACCATTC TTGAACAGTG 240 GAATTTTGGA TAAAATTAC CTCCGTCTGC TAGTTTGAGA GATGCATATA GGTTTGTTAG 300 AAATGCAGCT ACTAGCTGTC AAAAGGACAC CCCTCCACAG GCTAAGCCAG ATCCTTTGGC 360 CAAATATAAA TTTTGGGATG TTGATTTAAA GGAACGATTT TCTTTAGATT TA 412  HPV 52 6623 - 7031/409 bp CATATGTTGG GGCAATCAGT TGTTTGTCAC AGTTGTTAGA AAAAGGAAAA CACACTCGTA GCCACACATT AAAAAGGAAAA CACACTCGTA GCACTAACAT 60 GACTTTATGT GCTGAGGATA ACATTCATAA AATTAACATT 170 AACAGCTGAT GTTATGACA TACATTCATAA AAAACACACC CTTCGTCAT ACCCCACCAC CGTCTGCATC TTTGGAGGAC ACATATTAAA AAAACACACC ACTATTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA AAAACCACC ACCTAAAGGA AAGGAAGATC CTTTAAGGATT TGGACGAA AAAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA AAAGCACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA AAAGCACCC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA AAAGCACCC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA AAAGCACCC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA AAAGCACCC ACCTAAAGGA AAAACACCT ACCTTAAAGGA AAAACACCT ACCTTAATAAT TACAATATAA TACAATATAA AAAACACATC ACCTTAACTAC TACATATAA AAATATCCCT AAAGCATGA AAATACCAGAT AAATACCAGAT AAATACCAGAT AAATACCAGAT AAATACCAGAT AAATACCAGAT AAATACCAGA	(SEQ ID NO	: 664);					
CATTTGCTGG AACAATCAGC TTTTTATTAC CTGTGTTGAT ACTACCAGAA GTACAAATTT 60 AACTATTAGC ACTGCCACTG CTGCGGTTTC CCCAACATTT ACTCCAAGTA ACTTTAAGCA 120 ATATATTAGG CATGGGGAAG AGTATGAATT CCACAATGAT TTTCAATTAT GTAAAATTAC 180 TTTAACTACA GAGGTAATGG CTTATTACA CACAATGGAT CCTACCATTC TTGAACAGTG 240 GAATTTTGGA TAAAATTAC CTCCGTCTGC TAGTTTGAGA GATGCATATA GGTTTGTTAG 300 AAATGCAGCT ACTAGCTGTC AAAAGGACAC CCCTCCACAG GCTAAGCCAG ATCCTTTGGC 360 CAAATATAAA TTTTGGGATG TTGATTTAAA GGAACGATTT TCTTTAGATT TA 412  HPV 52 6623 - 7031/409 bp CATATGTTGG GGCAATCAGT TGTTTGTCAC AGTTGTTAGA AAAAGGAAAA CACACTCGTA GCCACACATT AAAAAGGAAAA CACACTCGTA GCACTAACAT 60 GACTTTATGT GCTGAGGATA ACATTCATAA AATTAACATT 170 AACAGCTGAT GTTATGACA TACATTCATAA AAAACACACC CTTCGTCAT ACCCCACCAC CGTCTGCATC TTTGGAGGAC ACATATTAAA AAAACACACC ACTATTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA AAAACCACC ACCTAAAGGA AAGGAAGATC CTTTAAGGATT TGGACGAA AAAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA AAAGCACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA AAAGCACCC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA AAAGCACCC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA AAAGCACCC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA AAAGCACCC ACCTAAAGGA AAAACACCT ACCTTAAAGGA AAAACACCT ACCTTAATAAT TACAATATAA TACAATATAA AAAACACATC ACCTTAACTAC TACATATAA AAATATCCCT AAAGCATGA AAATACCAGAT AAATACCAGAT AAATACCAGAT AAATACCAGAT AAATACCAGAT AAATACCAGAT AAATACCAGA							
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ATATATTAGG CATGGGGAAG AGTATGAATT GCAATTTATT TTTCAATTAT GTAAAATTAC TTTAACTACA GAGGTAATGG CTTATTTACA CACAATGGAT CCTACCATTC TTGAACAGTG GAATTTTGGA TTAACATTAC CTCCGTCTGC TAGTTTGGAG GATGCATATA GGTTTGTTAG AAATGCAGCT ACTAGCTGTC AAAAGGACAC CCCTCCACAG GCTAAGCCAG ATCCTTTGGC CAAATATAAA TTTTGGGATG TTGATTTAAA GGAACGATTT TCTTTAGATT TA  HPV 52 6623 - 7031/409 bp CATATGTTGG GGCAATCAGT TGTTTGTCAC AGTTGTGGAT ACCACTCGTA GCACTAACAT GACTTTATGT GCTGAGGATA AAAAGGAAAG CACATATAAA AATGAAAATT TTAAGGAATA CCTTCGTCAT GGCGAGGAAT TTGATTTACA ATTTATTTTT CAATTGTGC AAAATTACATT AACAGCTGAT GTTATGACAT ACATTCATAA GATGAATGCC ACTATTTTAG AGGACTGGCA ATTTGGCCTT ACCCCACCAC CGTCTGCATC TTTGGAGGAC ACATACAGAT TTGTCACTTC TACTGCTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCAGATTTA  (SEQ ID NO: 666);  HPV 53 6614 - 7022/409 bp CATCTGTTGG AACAACACAC AGTCTATGTC TACATATAT TCAACAGAA TTAAACACAC GACTCTTCC GCAACCACA AGTCTATGTC TACATATAT TCAACAGAA TTAAACACAC GACTCTTCC GCAACCACA AGTCTATGTC TACATATAT TCAACAGAA TTAAACACAT TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAAACACACT TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAAACACACC TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG AAATACAGAT ATGTGAAAAGACACAC ATTTAACATAC TTAGAATTCT ACCTTACTGG AAGACTAGAA TAAAACAGAA ATGAATTACA ATTTGAGAGAC AAATACAGAT ATGTGAAAAGACAA ATGAATTACA ATTTGAGAAT ACCTTACTGG AAGACTGGAA TAATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAATTCT ACCTTACTGG AAGACTGGAA TAATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAATTCT ACCTTACTGG AAGACTGGAA TAATACAGAT ATGTGAAAAGACACAC CTTTAGAATTCT ACCTTACTGG AAGACTGGAA TAATACAGAT ATGTTAAAAGACACAC CTTTAGAATTCT ACCTTACTGG AAGACTGGAA TAATACAGAT ATGTTAAAAGACACAC CTTTAGAATTCT ACCTTA							
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GAATTTTGGA TTAACATTAC CTCCGTCTGC TAGTTTGGAG GATGCATATA GGTTTGTTAG AAATGCAGCT ACTAGCTGTC AAAAGGACAC CCCTCCACAG GCTAAGCCAG ATCCTTTGGC 360 CAAATATAAA TTTTGGGATG TTGATTTAAA GGAACGATTT TCTTTAGATT TA  (SEQ ID NO: 665);  HPV 52							
AAATGCAGCT ACTAGCTGTC AAAAGGACAC CCCTCCACAG GCTAAGCCAG ATCCTTTGGC 360 CAAATATAAA TTTTGGGATG TTGATTTAAA GGAACGATTT TCTTTAGATT TA 412 (SEQ ID NO: 665);  HPV 52							
CAAATATAAA TTTTGGGATG TTGATTTAAA GGAACGATTT TCTTTAGATT TA 412 (SEQ ID NO: 665);  HPV 52 6623 - 7031/409 bp CATATGTTGG GGCAATCAGT TGTTTGTCAC AGTTGTGGAT ACCACTCGTA GCACTAACAT 60 GACTTTATGT GCTGAGGTTA AAAAGGAAAG CACATATAAA AATGAAAATT TTAAGGAATA 120 CCTTCGTCAT GGCGAGGAAT TTGATTTACA ATTTATTTT CAATTGTGCA AAATTACATT 180 AACAGCTGAT GTTATGACAT ACATTCATAA GATGGATGCC ACTATTTAG AGGACTGGCA 240 ATTTGGCCTT ACCCCACCAC CGTCTGCATC TTTGGAGGAC ACATACAGAT TTGTCACTTC 300 TACTGCTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA 360 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCAGATTTA 409 CSEQ ID NO: 666);  HPV 53 6614 - 7022/409 bp CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60 GACTCTTTCC GCAACCACAC AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 340							
(SEQ ID NO: 665);  HPV 52 6623 - 7031/409 bp CATATGTTGG GGCAATCAGT TGTTTGTCAC AGTTGTGGAT ACCACTCGTA GCACTAACAT 60 GACTTTATGT GCTGAGGTTA AAAAGGAAAG CACATATAAA AATGAAAATT TTAAGGAATA 120 CCTTCGTCAT GGCGAGGAAT TTGATTTACA ATTTATTTTT CAATTGTGCA AAATTACATT 180 AACAGCTGAT GTTATGACAT ACATTCATAA GATGGATGCC ACTATTTAG AGGACTGGCA 240 ATTTGGCCTT ACCCCACCAC CGTCTGCATC TTTGGAGGAC ACATACAGAT TTGTCACTTC 300 TACTGCTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA 360 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCAGATTTA 409 CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60 GACTCTTTCC GCAACCACAC AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300							
HPV 52 6623 - 7031/409 bp  CATATGTTGG GGCAATCAGT TGTTTGTCAC AGTTGTGGAT ACCACTCGTA GCACTAACAT 60 GACTTTATGT GCTGAGGTTA AAAAGGAAAG CACATATAAA AATGAAAATT TTAAGGAATA 120 CCTTCGTCAT GGCGAGGAAT TTGATTTACA ATTTATTTT CAATTGTGCA AAATTACATT 180 AACAGCTGAT GTTATGACAT ACATTCATAA GATGGATGCC ACTATTTAG AGGACTGGCA 240 ATTTGGCCTT ACCCCACCAC CGTCTGCATC TTTGGAGGAC ACATACAGAT TTGTCACTTC 300 TACTGCTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA 360 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCAGATTTA 409 (SEQ ID No: 666);  HPV 53 6614 - 7022/409 bp CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60 GACTCTTTCC GCAACCACA AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300			TTGATTTAAA	GGAACGATTT	TCTTTAGATT	TA	412
CATATGTTGG GGCAATCAGT TGTTTGTCAC AGTTGTGGAT ACCACTCGTA GCACTAACAT 60 GACTTTATGT GCTGAGGTTA AAAAGGAAAG CACATATAAA AATGAAAATT TTAAGGAATA 120 CCTTCGTCAT GGCGAGGAAT TTGATTTACA ATTTATTTT CAATTGTGCA AAATTACATT 180 AACAGCTGAT GTTATGACAT ACATTCATAA GATGGATGCC ACTATTTAG AGGACTGGCA 240 ATTTGGCCTT ACCCCACCAC CGTCTGCATC TTTGGAGGAC ACATACAGAT TTGTCACTTC 300 TACTGCTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA 360 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCAGATTTA 409 (SEQ ID NO: 666);  HPV 53 6614 - 7022/409 bp CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60 GACTCTTTCC GCAACCACAC AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300	(SEQ ID NO:	. 665/;					
GACTTTATGT GCTGAGGTTA AAAAGGAAAG CACATATAAA AATGAAAATT TTAAGGAATA 120 CCTTCGTCAT GGCGAGGAAT TTGATTTACA ATTTATTTT CAATTGTGCA AAATTACATT 180 AACAGCTGAT GTTATGACAT ACATTCATAA GATGGATGCC ACTATTTAG AGGACTGGCA 240 ATTTGGCCTT ACCCCACCAC CGTCTGCATC TTTGGAGGAC ACATACAGAT TTGTCACTTC 300 TACTGCTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA 360 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCAGATTTA 409 (SEQ ID NO: 666);  HPV 53 6614 - 7022/409 bp CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60 GACTCTTTCC GCAACCACAC AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300	HPV 52	6623 - 703	31/409 bp				
CCTTCGTCAT GGCGAGGAAT TTGATTTACA ATTTATTTT CAATTGTGCA AAATTACATT 180 AACAGCTGAT GTTATGACAT ACATTCATAA GATGGATGCC ACTATTTAG AGGACTGGCA 240 ATTTGGCCTT ACCCCACCAC CGTCTGCATC TTTGGAGGAC ACATACAGAT TTGTCACTTC 300 TACTGCTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA 360 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTCT GCAGATTTA 409 (SEQ ID NO: 666);  HPV 53 6614 - 7022/409 bp CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60 GACTCTTTCC GCAACCACAC AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300	CATATGTTGG	GGCAATCAGT	TGTTTGTCAC	AGTTGTGGAT	ACCACTCGTA	GCACTAACAT	60
AACAGCTGAT GTTATGACAT ACATTCATAA GATGGATGCC ACTATTTTAG AGGACTGGCA ATTTGGCCTT ACCCCACCAC CGTCTGCATC TTTGGAGGAC ACATACAGAT TTGTCACTTC TACTGCTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTTCT GCAGATTTA  (SEQ ID NO: 666);  HPV 53 6614 - 7022/409 bp CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60 GACTCTTTCC GCAACCACAC AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300	${\tt GACTTTATGT}$	$\tt GCTGAGGTTA$	AAAAGGAAAG	CACATATAAA	AATGAAAATT	TTAAGGAATA	120
ATTTGGCCTT ACCCCACCAC CGTCTGCATC TTTGGAGGAC ACATACAGAT TTGTCACTTC TACTGCTATA ACTTGTCAAA AAAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA 360 CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTTCT GCAGATTTA (SEQ ID NO: 666);  HPV 53 6614 - 7022/409 bp CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60 GACTCTTTCC GCAACCACAC AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300	CCTTCGTCAT	GGCGAGGAAT	${\tt TTGATTTACA}$	ATTTATTTTT	CAATTGTGCA	AAATTACATT	180
TACTGCTATA ACTTGTCAAA AAACACACC ACCTAAAGGA AAGGAAGATC CTTTAAAGGA CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTTCT GCAGATTTA (SEQ ID NO: 666);  HPV 53	AACAGCTGAT	GTTATGACAT	ACATTCATAA	GATGGATGCC	ACTATTTTAG	AGGACTGGCA	240
CTATATGTTT TGGGAGGTGG ATTTAAAAGA AAAGTTTTCT GCAGATTTA 409 (SEQ ID NO: 666);  HPV 53 6614 - 7022/409 bp CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60 GACTCTTTCC GCAACCACAC AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300							
(SEQ ID NO: 666);  HPV 53 6614 - 7022/409 bp  CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60  GACTCTTTCC GCAACCACAC AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120  TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180  GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240  TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300						CTTTAAAGGA	
HPV 53 6614 - 7022/409 bp CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60 GACTCTTTCC GCAACCACAC AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300			ATTTAAAAGA	AAAGTTTTCT	GCAGATTTA		409
CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60 GACTCTTTCC GCAACCACAC AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300	(SEQ ID NO	: 666);					
CATCTGTTGG AACAATCAGT TATTTGTAAC TGTTGTGGAT ACCACCAGGA ATACAAACAT 60 GACTCTTTCC GCAACCACAC AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300	HPV 53	6614 - 702	22/409 bp				
GACTCTTTCC GCAACCACA AGTCTATGTC TACATATAAT TCAAAGCAAA TTAAACAGTA 120 TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300			•	TGTTGTGGAT	ACCACCAGGA	ATACAAACAT	60
TGTTAGACAT GCAGAGGAAT ATGAATTACA ATTTGTGTTT CAACTATGTA AAATATCCCT 180 GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300							
GTCTGCTGAG GTTATGGCCT ATTTACATAC TATGAATTCT ACCTTACTGG AAGACTGGAA 240 TATAGGTTTG TCGCCTCCTG TTGCCACTAG CTTAGAGGAC AAATACAGAT ATGTGAAAAG 300							180
							240
TGCAGCTATA ACCTGTCAAA AGGATCAGCC CCCTCCTGAA AAGCAGGACC CACTATCTAA 360							300
	TGCAGCTATA	ACCTGTCAAA	AGGATCAGCC	${\tt CCCTCCTGAA}$	AAGCAGGACC	CACTATCTAA	360

ATATAAATTT TGGGAGGTCA ATTTGCAAAA CAGTTTTTCT GCTGATTTG (SEQ ID NO: 667);	409
HPV 54 6561 - 6972/412 bp  TATTTGTTGG GGCAATCAGG TGTTTTTAAC AGTTGTAGAT ACCACCCGTA GTACTAACCT AACATTGTGT GCTACAGCAT CCACGCAGGA TAGCTTTAAT AATTCTGACT TTAGGGAGTA TATTAGACAT GTGGAGGAAT ATGATTTACA GTTTATATTT CAGTTATGTA CCATAACCCT TACAGCAGAT GTTATGGCCT ATATTCATGG AATGAATCCC ACTATTCTAG AGGACTGGAA CTTTGGTATA ACCCCCCCAG CTACAAGTAG TTTGGAGGAC ACATATAGGT TTGTACAGTC ACAGGCCATT GCATGTCAAA AGAATAATGC CCCTGCAAAG GAAAAGGAGG ATCCTTACAG TAAATTTAAT TTTTGGACTG TTGACCTTAA GGAACGATTT TCATCTGACC TT (SEQ ID NO: 668);	60 120 180 240 300 360 412
HPV 56 6559 - 6967/409 bp CATTTGCTGG GGTAATCAAT TATTTGTTAC TGTAGTAGAT ACTACTAGAA GTACTAACAT GACTATTAGT ACTGCTACAG AACAGTTAAG TAAATATGAT GCACGAAAAA TTAATCAGTA CCTTAGACAT GTGGAGGAAT ATGAATTACA ATTTGTTTT CAATTATGCA AAATTACTTT GTCTGCAGAG GTTATGGCAT ATTTACATAA TATGAATGCT AACCTACTGG AGGACTGGAA TATTGGGTTA TCCCCGCCAG TGGCCACCAG CCTAGAAGAT AAATATAGAT ATGTTAGAAG CACAGCTATA ACATGTCAAC GGGAACAGCC ACCAACAGAA AAACAGGACC CATTAGCTAA ATATAAATTT TGGGATGTTA ACTTACAGGA CAGTTTTTCT ACAGACCTGG ATCAATTTC (SEQ ID NO: 669);	60 120 180 240 300 360 419
HPV 58 6608 - 7016/409 bp  CATTTGCTGG GGCAATCAGT TATTTGTTAC CGTGGTTGAT ACCACTCGTA GCACTAATAT GACATTATGC ACTGAAGTAA CTAAGGAAGG TACATATAAA AATGATAATT TTAAGGAATA TGTACGTCAT GTTGAAGAAT ATGACTTACA GTTTGTTTTT CAGCTTTGCA AAATTACACT AACTGCAGAG ATAATGACAT ATATACATAC TATGGATTCC AATATTTTGG AGGACTGGCA ATTTGGTTTA ACACCTCCTC CGTCTGCCAG TTTACAGGAC ACATATAGAT TTGTTACCTC CCAGGCTATT ACTTGCCAAA AAACAGCACC CCCTAAAGAA AAGGAAGATC CATTAAATAA ATATACTTTT TGGGAGGTTA ACTTAAAGGA AAAGTTTTCT GCAGATCTA (SEQ ID NO: 670);	120 180 240 300 360 409
HPV 59 6571 - 6985/415 bp  TATATGTTGG CACAATCAAT TGTTTTTAAC AGTTGTAGAT ACTACTCGCA GCACCAATCT TTCTGTGTGT GCTTCTACTA CTTCTTCTAT TCCTAATGTA TACACACCTA CCAGTTTTAA AGAATATGCC AGACATGTGG AGGAATTTGA TTTGCAGTTT ATATTTCAAC TGTGTAAAAT AACATTAACT ACAGAGGTAA TGTCATACAT TCATAATATG AATACCACTA TTTTGGAGGA TTGGAATTTT GGTGTTACAC CACCTCCTAC TGCTAGTTTA GTTGACACAT ACCGTTTTGT TCAATCTGCT GCTGTAACTT GTCAAAAGGA CACCGCACCG	60 120 180 240 300 360 415
HPV 61 6732 - 7146/415 bp  TATTTGTTGG TTTAATGAAT TGTTTGTAAC CGTTGTGGAT ACCACCCGCA GTACTAATTT AACCATTTGT ACTGCTACAT CCCCCCCTGT ATCTGAATAT AAAGCCACAA GCTTTAGGGA ATATTTGCGC CATACAGAGG AGTTTGATTT GCAATTTATT TTTCAGTTAT GTAAAATACA TTTAACCCCT GAAATTATGG CCTACCTACA TAATATGAAT AAGGCCTTGT TGGATGACTG GAACTTTGGT GTGGTACCAC CACCCTCTAC CAGTTTAGAA GACACATATA GGTTTTTGCA GTCCAGAGCT ATTACATGTC AGAAGGGTGC TGCTGCCCCG CCGCCCAAGG AGGATCGCTA TGCCAAGTTA TCCTTTTGGA CTGTTGATTT ACGAGACAAG TTTTCCACTG ATTTG ((SEQ ID NO: 672);	60 120 180 240 300 360 415

HPV 62 21 - 429/409 bp	
TATTTGTTGG TTTAATGAAC TGTTTGTTAC TGTGGTGGAT ACTACCAGAA GTACTAATTT	60
TACTATTTGT ACCGCCTCCA CTGCTGCAGC AGAATACACG GCTACCAACT TTAGGGAATT	120
TTTGCGACAC ACGGAGGAAT TTGATTTGCA ATTTATATTT CAATTGTGCA AAATACAGTT	180
AACCCCCGAA ATTATGGCCT ACCTGCATAA TATGAACAAG GACCTTTTGG ATGACTGGAA	240
CTTTGGGGTT TTACCTCCCC CTTCCACTAG TTTAGATGAG ACATATCACT ATTTCGAGTC	300
TCGGGCTATT ACATGTCAAA GGGGGCTGCC TACCCGTCCC AAGGTGGACC CGTATGCGCA	360.
	409
AATGACATTT TGGACTGTGG ATCTTAAGGA CAAGTTGTCT ACTGATTTG	409
(SEQ ID NO: 673);	
HPV 66 6609 - 7017/409 bp	
· · · · · · · · · · · · · · · · · · ·	<b>C</b> 0
CATATGCTGG GGTAATCAGG TATTTGTTAC TGTTGTGGAT ACTACCAGAA GCACCAACAT	60
GACTATTAAT GCAGCTAAAA GCACATTAAC TAAATATGAT GCCCGTGAAA TCAATCAATA	120
CCTTCGCCAT GTGGAGGAAT ATGAACTACA GTTTGTGTTT CAACTTTGTA AAATAACCTT	180
AACTGCAGAA GTTATGGCAT ATTTGCATAA TATGAATAAT ACTTTATTAG ACGATTGGAA	240
TATTGGCTTA TCCCCACCAG TTGCAACTAG CTTAGAGGAT AAATATAGGT ATATTAAAAG	300
CACAGCTATT ACATGTCAGA GGGAACAGCC CCCTGCAGAA AAGCAGGATC CCCTGGCTAA	360
ATATAAGTTT TGGGAAGTTA ATTTACAGGA CAGCTTTTCT GCAGACCTG	409
(SEQ ID NO: 674);	
HPV 67 6584 - 6992/409 bp	
TATATGCTGG GGTAATCAAA TATTTGTTAC TGTTGTAGAC ACTACACGTA GTACCAACAT	60
GACTTTATGT TCTGAGGAAA AATCAGAGGC TACATACAAA AATGAAAACT TTAAGGAATA	120
CCTTAGACAT GTGGAAGAAT ATGATTTGCA GTTTATATTT CAGCTGTGCA AAATATCCCT	180
TACTGCAAAT GTTATGCAAT ACATACACAC CATGAATCCA GATATATTAG AGGACTGGCA	240
ATTTGGCCTT ACACCACCTC CTTCAGGTAA TTTACAGGAC ACATATAGAT TTGTTACCTC	300
GCAGGCTATT ACCTGTCAAA AAACATCCCC TCCAACAGCA AAGGAAGATC CTCTTAAAAA	360
GTACAGTTTT TGGGAAATCA ATTTAAAGGA AAAATTTTCT GCAGATTTA	409
(SEQ ID NO: 675);	
HPV 68 2582 - 2996/415 bp	
TATTTGTTGG CATAATCAAT TATTTCTTAC TGTTGTGGAT ACCACTCGCA GTACCAATTT	60
TACTTTGTCT ACTACTACTG AATCAGCTGT ACCAAATATT TATGATCCTA ATAAATTTAA	120
GGAATATATT AGGCATGTTG AGGAATATGA TTTGCAATTT ATATTTCAGT TGTGTACTAT	180
AACATTGTCC ACTGATGTAA TGTCCTATAT ACATACTATG AATCCTGCTA TTTTGGATGA	240
TTGGAATTTT GGTGTTGCCC CTCCACCATC TGCTAGTCTT GTAGATACAT ACCGCTATCT	300
GCAATCAGCA GCAATTACAT GTCAAAAAGA CGCCCCTGCA CCTACTAAAA AGGATCCATA	360
TGATGGCTTA AACTTTTGGA ATGTAAATTT AAAGGAAAAG TTTAGTTCTG AACTG	415
(SEO ID NO: 676);	
HPV 69 6509 - 6923/415 bp	
CATTTGTTGG GGCAACCAAT TGTTTGTTAC TTGTGTAGAT ACTACCCGCA GTACCAACCT	60
CACTATTAGT ACTGTATCTG CACAATCTGC ATCTGCCACT TTTAAACCAT CAGATTATAA	120
GCAGTTTATA AGGCATGGTG AGGAATATGA ATTACAGTTT ATATTTCAAT TGTGTAAAAT	180
TACTCTTACC ACTGATGTAA TGGCCTATAT CCATACAATG AATTCTACTA TTTTGGAAAA	240
TTGGAATTTT GGCCTTACCT TGCCTCCTAC TGCTAGTTTG GAAGATGCAT ATAGGTTTAT	300
TAAAAATTCA GCTACTACAT GTCAACGCGA TGCCCCTGCA CAGCCCAAGG AGGATCCATT	360
TAGTAAATTA AAATTTTGGG ACGTTGATCT TAAAGAAAAG TTTTCTATTG ATTTA	415
(SEO ID NO: 677);	-220
(DDQ 1D 110. 0///)	
HPV 6 6743 - 7151/409 bp	
TATTTGTTGG GGTAATCAAC TGTTTGTTAC TGTGGTAGAT ACCACACGCA GTACCAACAT	60
101101101101101101101101101101101101101	

GACATTATGT GCATCCGTAA CTACATCTTC CATGCGTCAT GTGGAAGAGT ATGATTTACA GTCTGCTGAA GTAATGGCCT ATATTCACAC CTTTGGGTTA TCGCCTCCCC CAAATGGTAC ACAGGCCATT ACCTGTCAAA AGCCCACTCC CCTTAGTTTT TGGGAGGTTA ATTTAAAAGA (SEQ ID NO: 678);	ATTTATTTT AATGAATCCC ATTAGAAGAT TGAAAAGGAA	CAATTATGTA TCTGTTTTGG ACCTATAGGT AAGCCAGATC	GCATTACATT AAGACTGGAA ATGTGCAGTC	120 180 240 300 360 409
HPV 70 6549 - 6963/415 bp CATTTGTTGG CATAACCAGT TGTTTATTAC TACATTGTCT GCCTGCACCG AAACGGCCAT GGAATATACT AGGCATGTGG AGGAATATGA CACATTAACT GCTGACGTTA TGGCCTACAT TTGGAATATA GGAGTTACCC CTCCACCATC ACAATCAGCA GCTATAGCAT GTCAAAAGGA TGACGATTTA AAATTTTGGA ATGTTGATTT (SEQ ID NO: 679);	ACCTGCTGTA TTTACAATTT CCATACTATG TGCAAGCTTG TGCTCCTACA	TATAGCCCTA ATATTTCAAT AATCCTGCAA GTGGACACGT CCTGAAAAAA	CAAAGTTTAA TGTGTACTAT TTTTGGACAA ATAGGTATTT AGGATCCCTA	60 120 180 240 300 360 415
HPV 72 6758 - 7172/415 bp CATCTGTTGG TTTAATGAGC TTTTTGTGAC AACTATTTGT ACTGCCACAG CGTCCTCTGT GTATCTTCGC CACACTGAGG AATTTGATTT CTTAACTCCT GAAATTATGG CCTACTTGCA GAATTTTGGT GTGGTGCCTC CTCCTTCTAC GTCTCGTGCC ATTACCTGTC AAAAGGGGGC TGCTAACTTA TCCTTTTGGA CTGTGGATTT (SEQ ID NO: 680);	ATCAGAATAT GCAGTTTATA CAATATGAAT CAGTTTGGAT TGCCACCCCT	ACAGCTTCTA TTTCAACTGT AAGGCCTTAT GATACCTATA CCTCCTAAAG	ATTTTCGTGA GTAAAATTCA TGGATGACTG GGTTTTTGCA AAGATCCATA	60 120 180 240 300 360 415
HPV 74 1613 - 2027/415 bp TATTTGTTGG GGTAATCAAT TATTTGTTAC GACTGTGTGT GCTCCTACCT CACAATCGCC ACAATACATG CGACATGTGG AGGAATTTGA TAAGTTAACT GCTGAGGTTA TGGCCTATAT GTGGAACTTT GGGCTAACGC CTCCCCCAA GCAGTCCCAG GCTATTACAT GTCAAAAACC TGCAAATTTA AGTTTTTGGG AAGTTAATCT (SEQ ID NO: 681);	TTCTGCTACA TTTGCAATTT TCATACTATG TGGTACTTTA TACGCCTGAT	TATAATAGTT ATTTTTCAAT AATCCTACAG GAAGACACCT AAAGCAAAGC	CAGACTACAA TATGTAGTAT TTTTAGAAGA ACAGATATGT CCAATCCCTA	60 120 180 240 300 360 415
HPV 82 6536 - 6950/415 bp CATTTGCTGG AATAATCAGC TTTTTATTAC AACCATTAGC ACTGCTGTTA CTCCATCTGT GCAGTACATT AGGCATGGG AAGAATATGA CACTTTAACT ACTGAAATTA TGGCTTACCT GTGGAATTTT GGATTAACAT TGCCCCCCTC AAAAAATGCA GCAACATCCT GTCACAAGGA GGCAAAATAT AAATTTTGGA ATGTAGACCT (SEQ ID NO: 682);	TGCACAACA ATTGCAATTT GCACACCATG CGCTAGTTTG CAGTCCTCCA	TTTACTCCAG ATATTTCAAT GATTCTACAA GAGGATGCCT CAGGCTAAAG	CAAACTTTAA TGTGTAAAAT TTTTAGAACA ATCGATTTGT AAGACCCTTT	60 120 180 240 300 360 415
HPV CP8061 21 - 432/412 bp CATTTGTTGG GGCAATCAGC TTTTTGTAAC GTCCATCTGT GCTACCAAAA CTGTTGAGTC TTTGAGACAT GGAGAAGAAT TTGATTTGCA AACAGCTGAA ATTATGGCCT ACTTACATCG	TACATATAAA ATTTATATTT	GCCTCTAGTT CAACTATGTG	TCATGGAATA TTATTAATTT	60 120 180 240

TTTTTGGTTC TTACCACCTC CTACTGCTAG TCAGGCCATA ACCTGTCAGA AAAACAGTCC AGATCTTACA TTTTGGGAGG TGGATTTAAA (SEQ ID NO: 683);	TCCTCCTGCA	GAAAAAAAGG	ACCCCTATGC	300 360 412
HPV CP8304 21 - 432/412 bp TATTTGTTGG TTTAATGAAA TGTTTGTTAC A TACTATTTGC ACAGCTACAT CTGCTGCTGC A TCTGCGCCAT ACAGAGGAAT ATGATTTGCA A AACACCAGAA ATTATGGCCT ACTTACATAA T TTTTGGTGTG TTGCCACCTC CTTCCACCAG T CGGCCCATT ACCTGTCAAA AGGGTGCTGC T CGACATGTCA TTTTGGACAG TTGACCTTAA ( (SEQ ID NO: 684);	AGAATACAAG GTTTATTTTC TATGAACAAG TTTAGATGAC TGCCCCTGCG	GCCTCTAACT CAATTATGTA GCACTGTTGG ACATATCGCT CCCAAAGAGG	TTAAGGAATT AAATACAGTT ATGATTGGAA TTTTACAGTC ACCCTTATGC	60 120 180 240 300 360 412
HPV L1AE5 11 - 360/350 bp GGCACAACCA ATTATTTATA ACTGTGGTAG A CTACTGCAAC TACTAATCCA GTTCCATCTA C CACGCCATGT AGAGGAATAT GATTTACAAT C CTACTGATGT TATGTCTTAT ATACATAACA C TTGGTGTTAG TCCTCCCCCA TCTGCTAGCT C CTGCCATTAC ATGTCAGAAG GATGTGGTTG C (SEQ ID NO: 685);	TATATGAACC TTATATTTCA TGGATCCTAC TAGTAGATAC	TTCTAAATTT ATTGTGTAAA TATTTTAGAT ATATAGGTTT	AAGGAATACA ATTACACTTA AGTTGGAATT	60 120 180 240 300 350
HPV MM4 21 - 435/415 bp CATTTGCTGG AATAATCAGC TTTTTATTAC CACCATTAGC ACTGCTGTTA CTCAATCTGT CACCATTAACT AGGCATGGG AAGAATATGA CACTTTAACT ACTGAAATTA TGGCTTACCT CACCAAAAAATTTT GGATTAACCT TGCCCCCCTC AAAAAAATGCA GCAACATCCT GTCACAAGGA CGCAAAATAT AAATTTTGGA ATGTAGACCT CSEQ ID NO: 686);	TGCACAAACA ATTGCAATTT GCACACCATG AGCTAGTTTG CAGTCCTCCA	TTTACTCCAG ATATTTCAAT GATTCTACAA GAGGATGCCT CAGGCTAAAC	CAAACTTTAA TGTGTAAAAT TTTTAGAACA ATCGATTTGT AAGACCCTTT	60 120 180 240 300 360 415
HPV MM7 21 - 432/412 bp CATTTGTTGG TTTAATGAGT TATTTGTTAC A TACTATTCA GCTGCTGCTA CACAGGCTAA T CCTCCGCCAC ACCGAGGAAT ATGACTTACA C TACCCCTGAA ATTATGGCAT ACCTACATAG T TTTTGGCGTG TTACCACCTC CTTCCACCAG C CCGTGCTATT ACCTGCCAAA AGGGTCCTTC C TGGCCTTGTA TTTTGGGAGG TTGATTTAAA C (SEQ ID NO: 687); AND	TGAATACACA GGTTATATTG TATGAATGAA CCTTGATGAT CGCCCCTGCC	GCCTCTAACT CAACTTTGCA CATTTATTGG ACCTATCGCT CCTAAAAAGG	TTAAGGAATA AAATACATCT ATGAGTGGAA ATCTGCAGTC ATCCTTATGA	60 120 180 240 300 360 412
HPV MM8 21 - 432/412 bp TATATGCTGG TTTAATCAAT TGTTTGTCAC C TACTATTAGT GCTGCTACCA ACACCGAATC A CCTAAGACAT GTGGAGGAAT ATGATTTGCA C GACTCCAGAG GTCATGTCCT ATTTACATAC T TTTTGGTGTT GTGCCCCCTC CCTCCACAAG T TCGCGCCATT ACTTGCCAAA AGGGGGCCGC C TGGCATGTCC TTTTGGGATG TAGATTTAAA C (SEQ ID NO: 688).	AGAATATAAA GTTTATATTC TATGAATGAC TTTAGATGAT CGCCGCCAAG	CCTACCAATT CAGTTGTGTA TCCTTATTAG ACCTATAGGT CCTAAGGAAG	TTAAGGAATA AGGTCCGTCT ATGAGTGGAA ACTTGCAGTC ATCCTTATGC	60 120 180 240 300 360 412

Date:  $\frac{2/14/2003}{}$ 

Respectfully submitted,

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Dr. Tang-Yuan Chu